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See application file for complete search history.

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*Primary Examiner* — David Lazaro

Assistant Examiner — Robert Shaw

(74) *Attorney, Agent, or Firm* — Sughrue Mion, PLLC

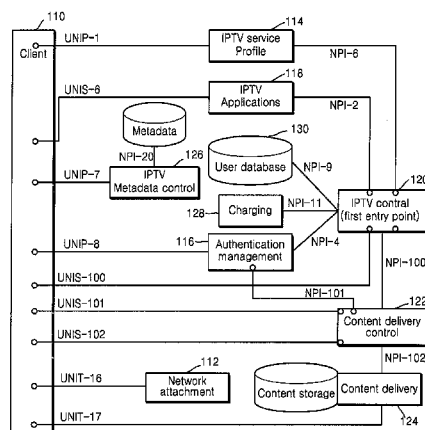
(57) **ABSTRACT**

A method of providing information regarding a service to a client includes receiving, at a first search server, first information regarding a plurality of service providers including a first service provider, receiving, at a second search server, second information regarding at least one service which is to be received from a first server of the first service provider, and providing the first information and the second information to a client, wherein the first search server and second search server are separate physical devices, and wherein the first search server and the second search server are separate from at least one server belonging to the plurality of service providers including the first server.

**14 Claims, 7 Drawing Sheets**

(Continued)

(Continued)



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 CPC ..... *H04N21/2665* (2013.01); *H04N 21/4147*  
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FIG. 1

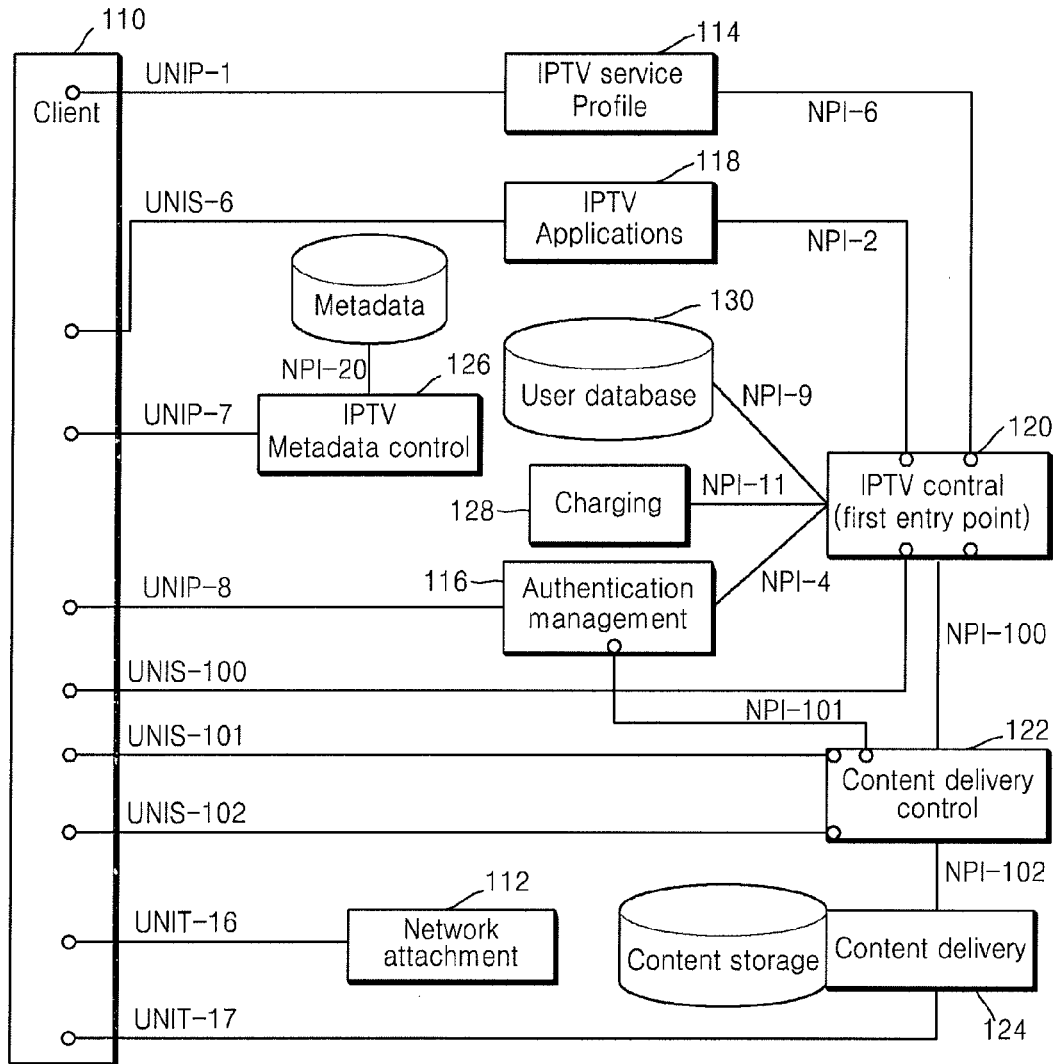


FIG. 2

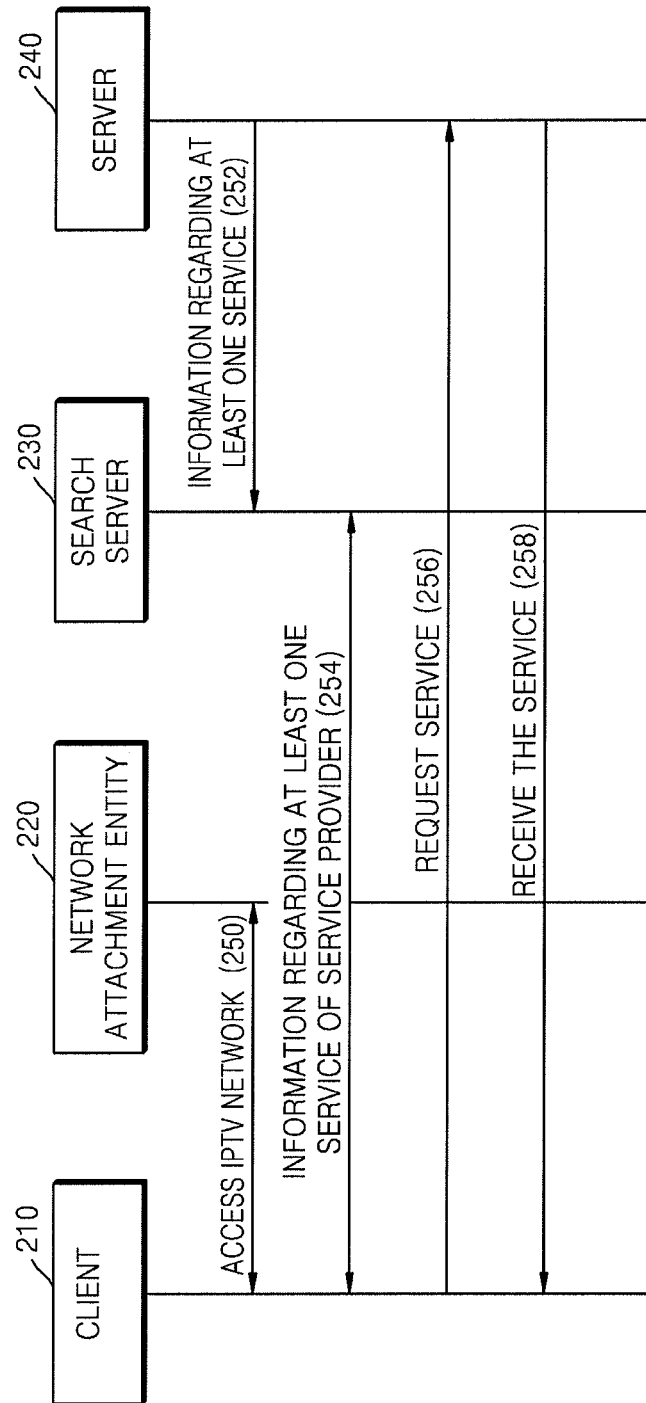


FIG. 3

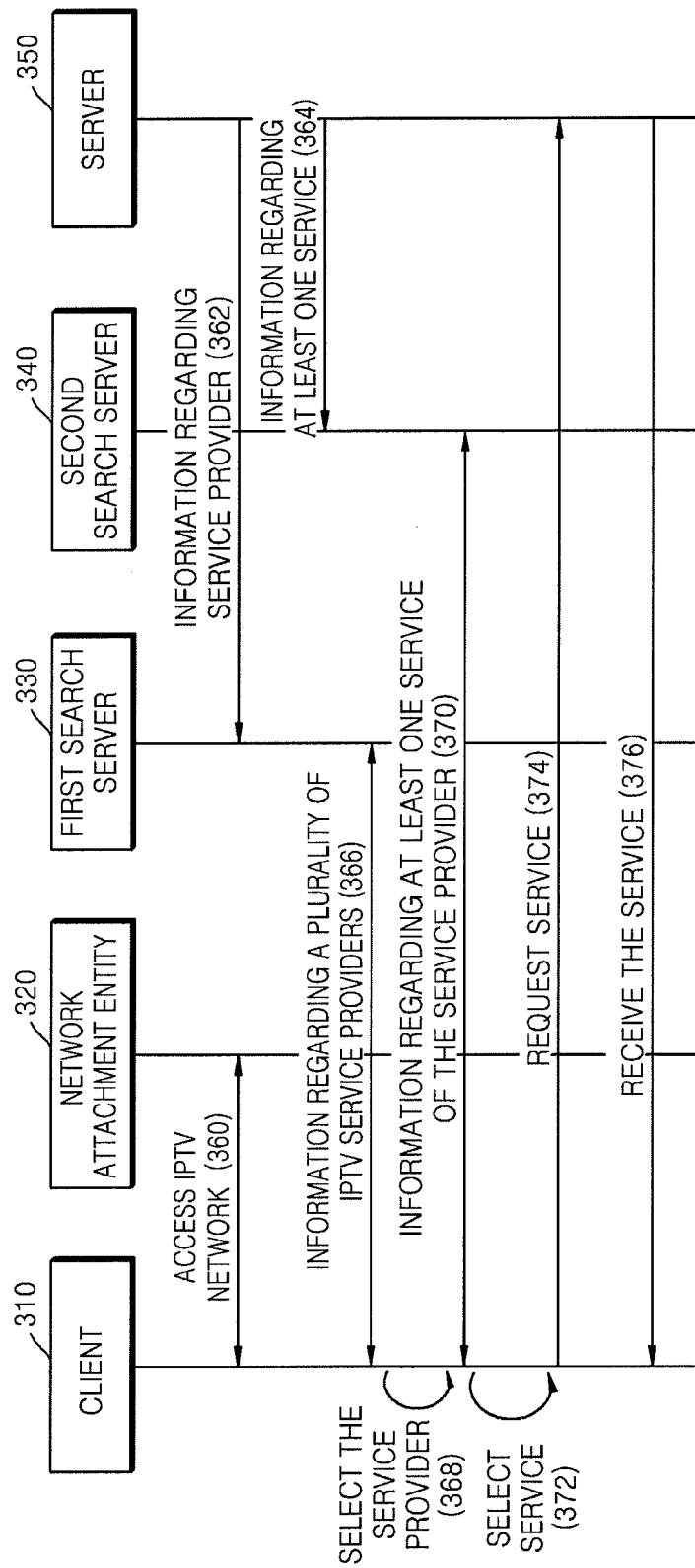


FIG. 4

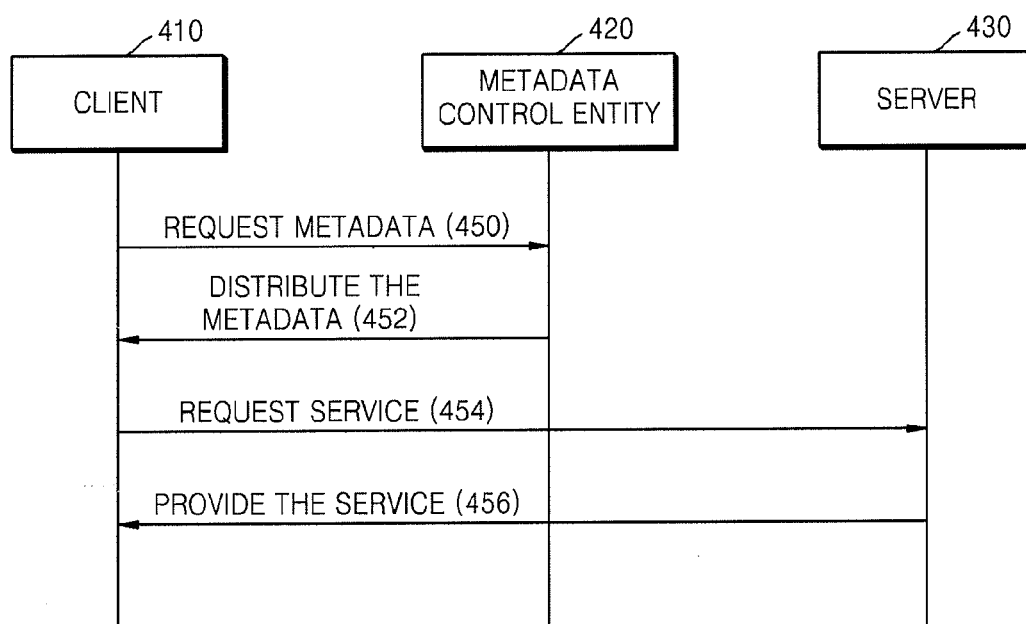


FIG. 5

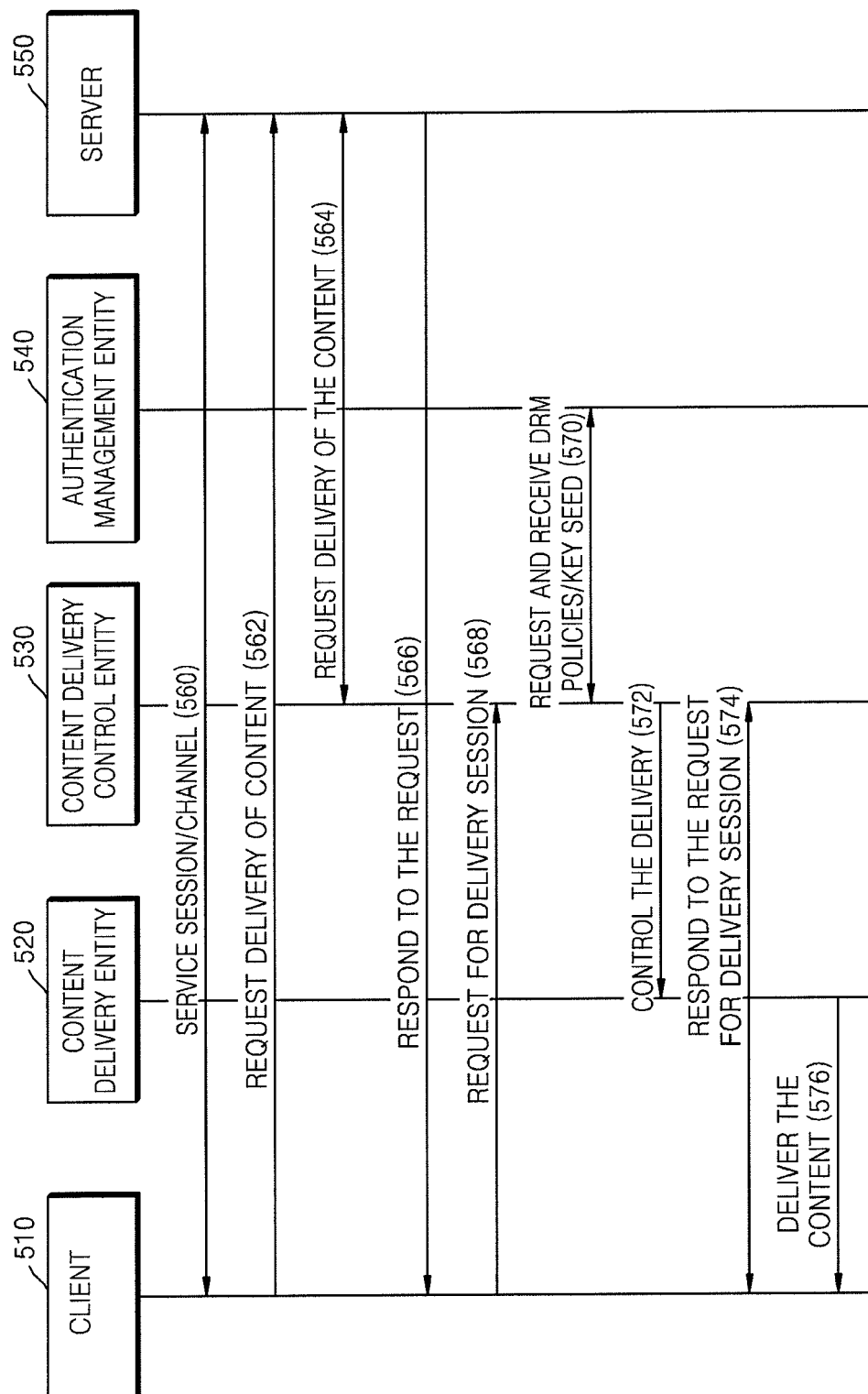




FIG. 6

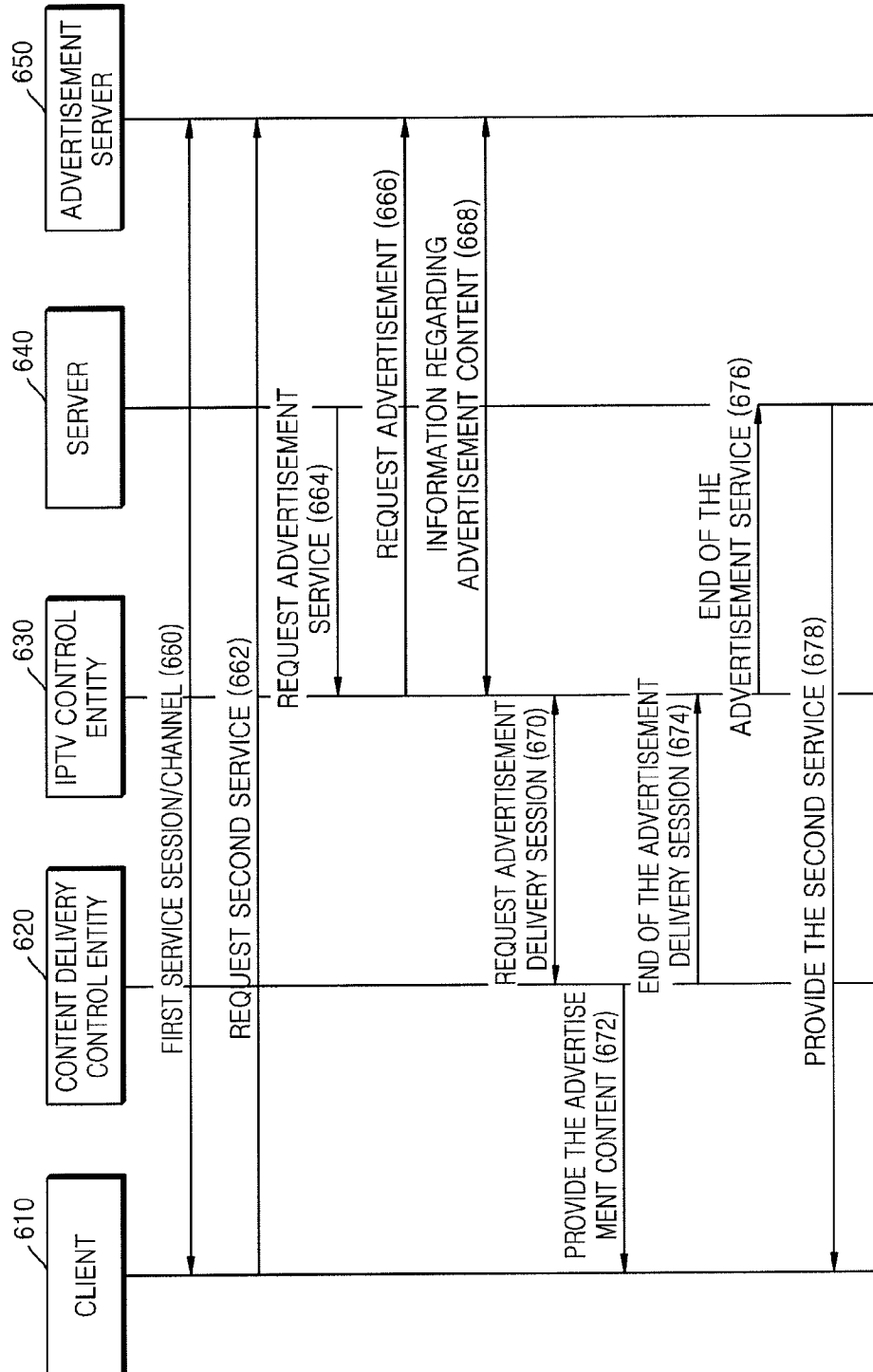


FIG. 7

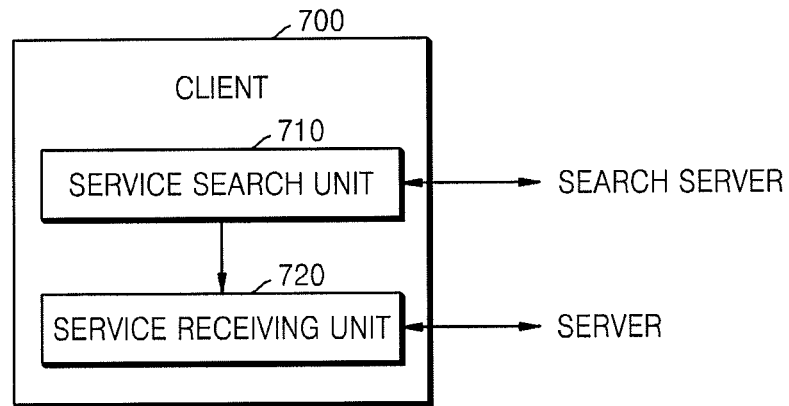


FIG. 8

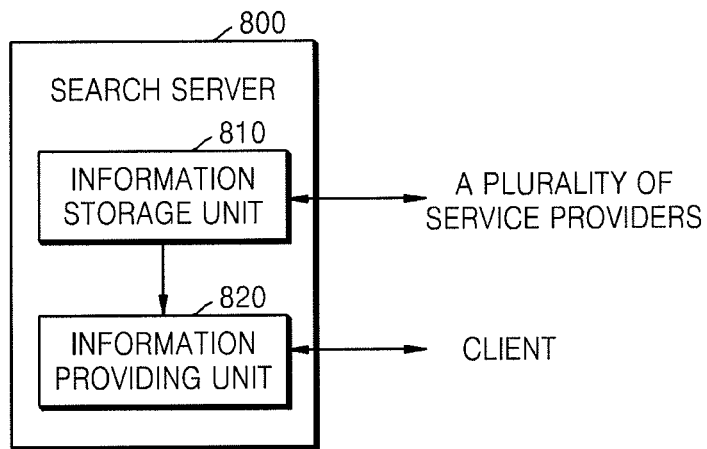
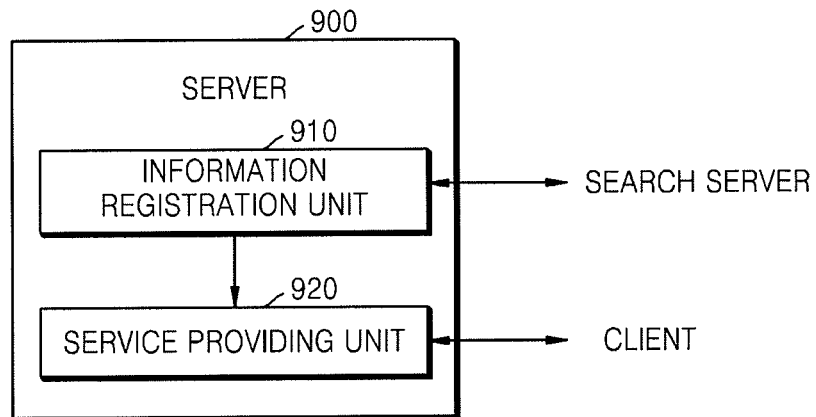


FIG. 9



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# METHOD AND APPARATUS FOR PROVIDING/RECEIVING SERVICE OF PLURALITY OF SERVICE PROVIDERS

## CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

This application is a divisional application of U.S. application Ser. No. 12/191,567 filed Aug. 14, 2008, which claims priority from Korean Patent Application No. 10-2008-0034208, filed on Apr. 14, 2008, in the Korean Intellectual Property Office, which claims the benefit of U.S. Provisional Application No. 60/957,252, filed on Aug. 22, 2007, in the U.S. Patent and Trademark Office, the disclosures of which are incorporated herein by reference in their entireties.

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

Methods and apparatuses consistent with the present invention relate to providing/receiving a service from a plurality of service providers, and more particularly, to a method and apparatus for allowing a client to select an Internet protocol television (IPTV) service from among IPTV services provided by a plurality of IPTV service providers, and receive the selected IPTV service from a server of the IPTV service provider.

### 2. Description of the Related Art

Internet Protocol Television (IPTV) includes a service providing information, moving picture content and a broadcast to a TV via an IP network, i.e., ultra high speed Internet. Since integrated services with communication and broadcasting have become available, much attention has been paid to IPTV, and activation of IPTV is expected to significantly affect not only communication and broadcasting industries but also content creation and household appliance industries.

In order to allow a client to receive an IPTV service via an IP network, an additional IPTV set top box is needed. That is, only clients having an IPTV set top box manufactured according to specifications determined by a service provider who provides an IPTV service can receive the IPTV service. For example, if IPTV service providers of three companies, i.e., an A company, a B company and a C company, are present, a service consumer purchasing a set top box of the A company can use only an IPTV service provided from the A company, and must further purchase a set top box from the B or C company in order to use an IPTV service of the B or C company, respectively. An IPTV network unique to a service provider is referred to as a managed network. Under a managed network, incompatibility between an IPTV service provider and a set top box reduces the range of selection of a service consumer, thereby degrading the quality of an IPTV service or preventing the fundamentals of IPTV service from being increased.

In order to solve incompatibility between an IPTV service provider and a set top box, the Open IPTV Forum that have been recently formed is conducting a discussion about standards for IPTV services. The Open IPTV Forum is discussing the creation of common standards independent of an IPTV service provider and the provision of an IPTV service based on the standards to a service consumer.

Open IPTV is aiming at making an interface and hardware platform that are independent of an IPTV service provider so that IPTV services can be received from a plurality of IPTV service providers via one set top box. According to Open IPTV, since all services provided from a plurality of IPTV

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service providers can be used via one set top box, the range of service selection of a service consumer can be increased.

The standards for IPTV services is now being established so that not only IPTV services that are provided via a conventional managed network and are dependent of an IPTV service provider but also IPTV services that are provided via an open Internet network and are independent of an IPTV service provider can be provided via one set top box.

## SUMMARY OF THE INVENTION

The present invention provides a method of providing/receiving a service by including a search server containing information regarding services of a plurality of service providers so that a client can receive a desired service by detecting the search server.

The present invention also provides a computer readable medium having recorded thereon a computer program for executing the method.

According to an aspect of the present invention, there is provided a method of allowing a client to receive services from a plurality of service providers, the method comprising receiving information regarding at least one service, which is to be received from a server of a service provider selected from among the plurality of service providers, from a search server; requesting the server to provide a service from among the at least one service; and receiving the service provided from the server in response to the request.

The service may be an IPTV (Internet protocol television) service, and the plurality of service providers are a plurality of IPTV service providers.

The receiving of the service may include receiving information regarding the plurality of IPTV service providers from a first search server; selecting the service provider based on information regarding the plurality of IPTV service providers; and receiving information regarding at least one IPTV service, which is to be received from the server of the selected provider, from a second search server.

According to another aspect of the present invention, there is provided a method of allowing a search server to provide information regarding at least one service of a plurality of service providers to a client, the method comprising receiving the information regarding the at least one service from a plurality of servers of the plurality of service providers, and registering the received information; and providing the registered information to the client.

The search server may include a first search server providing information regarding the plurality of IPTV service providers to the client; and a second search server providing information regarding at least one IPTV service, which is to be received from a server of a service provider selected from among the plurality of service providers based on the information regarding the plurality of IPTV service providers, to the client.

According to another aspect of the present invention, there is provided a method of allowing a server of a service provider to provide a predetermined service to a client, the method comprising registering information regarding at least one service that is to be provided from the service provider, with a search server; receiving a request for a service from a client, where the request is made by the client based on the registered information; and providing the service to the client in response to the request, wherein the search server provides the client with at least one service of a plurality of service providers including the service provider.

The registering of the information regarding the at least one service may include registering information regarding the

service provider with a first search server; and registering information regarding at least one IPTV service that is to be provided from the server, with a second search server.

According to another aspect of the present invention, there is provided a client for receiving services from a plurality of service providers, the client comprising a service search unit receiving information regarding at least one service, which is to be received from a server of a service provider selected from among the service providers, from a search server; and a service receiving unit requesting a service selected from among the at least one service based on the received information, and receiving the selected service provided from the server in response to the request.

According to another aspect of the present invention, there is provided a search server for providing a client with information regarding at least one service of a plurality of service providers, the search server comprising an information storage unit receiving information regarding at least one service from a plurality of servers of the service providers, and registering the received information; and an information providing unit providing the registered information to the client.

According to another aspect of the present invention, there is provided a computer readable recording medium having recorded thereon a computer program for executing the above methods.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The above and other features and aspects of the present invention will become more apparent by describing in detail exemplary embodiments thereof with reference to the attached drawings in which:

FIG. 1 illustrates an Internet Protocol Television (IPTV) network according to an embodiment of the present invention;

FIG. 2 is a flowchart illustrating providing/receiving a service according to an embodiment of the present invention;

FIG. 3 illustrates providing/receiving a service according to another embodiment of the present invention;

FIG. 4 illustrates providing/receiving a service according to another embodiment of the present invention;

FIG. 5 illustrates providing/receiving a service according to another embodiment of the present invention;

FIG. 6 illustrates providing/receiving a service according to another embodiment of the present invention;

FIG. 7 is a block diagram of a client according to an embodiment of the present invention;

FIG. 8 is a block diagram of a search server according to an embodiment of the present invention; and

FIG. 9 is a block diagram of a server according to an embodiment of the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

Hereinafter, exemplary embodiments of the present invention will be described in detail with reference to the accompanying drawings.

FIG. 1 illustrates an Internet Protocol Television (IPTV) network according to an embodiment of the present invention. Referring to FIG. 1, the IPTV network includes a client 110 and a plurality of IPTV entities. The IPTV entities include a network attachment entity 112, an IPTV service profile entity 114, an authentication management entity 116, an IPTV applications entity 118, an IPTV control entity 120, a content delivery control entity 122, a content delivery entity 124, an IPTV metadata control entity 126, a charging entity 128, and a user database entity 130.

The network attachment entity 112 allocates an IP address to the client 110, and performs network-level user authentication and network construction. In an open IPTV network, an Internet service provider provides the network attachment entity 112.

The IPTV service profile entity 114 retains user profile information of the client 110 related to an IPTV service. When the client 110 requests a service, the user profile information is referred to. For example, the user profile information is referred to in order to provide the client 110 with a personalized IPTV service.

The authentication management entity 116 is charged with authentication of the client 110.

The IPTV applications entity 118 is a server managed by each IPTV service provider. Here, an IPTV service includes not only a TV service, such as linear TV, but also an IPTV application, such as CoD (content on demand), Push CoD, content downloading, network PVR (Personal Video Recording), and messaging. The IPTV applications entity 118 can provide a graphical user interface (GUI) and service data to the client 110, using web-based techniques.

The IPTV control entity 120 provides the client 110 with information regarding the IPTV applications entity 118. For example, the IPTV control entity 120 provides a list of universal resource locators (URLs) of the IPTV applications entity 118. In this case, the list of URLs may be provided via a GUI. The IPTV control entity 120 controls delivery of an IPTV service for an authenticated user, and interacts with the authentication management entity 116 to this end. The IPTV control entity 120 can access the IPTV service profile entity 114 in order to provide an individualized IPTV service. If an advertisement needs to be included in an IPTV service, the IPTV control entity 120 accesses an IPTV applications entity providing the advertisement and controls inclusion of the advertisement.

The content delivery control entity 122 protects content and controls streaming reproduction. The content delivery control entity 122 checks whether a request from the client 110 is available, and checks whether a content access key transmitted from the client 110 is valid, before content delivery begins. Also, the content delivery control entity 122 manages a digital rights management (DRM) key and content encryption. The content delivery control entity 122 may update the DRM key by receiving related data from the authentication management entity 116. The content delivery control entity 122 may also control content reproduction during the content reproduction, i.e., streaming reproduction.

The content delivery entity 124 is charged with content processing, delivery and distribution, under control of the content delivery control entity 122.

The IPTV metadata control entity 126 collects meta data about IPTV services provided via the IPTV network from a content provider, and provides it to the client 110.

The charging entity 128 provides an IPTV service charging mechanism. IPTV service providers can individually make their own charging system.

The user database entity 130 retains information regarding the client 110. Each IPTV service provider can build a user database and store information, such as authentication information, which is not related to an IPTV service, in the user database.

Referring to FIG. 1, the client 110 and the entities 112 through 130 exchange a control signal with one another via a predetermined interface. The name of each of the interfaces illustrated in FIG. 1 is optionally selected and thus may be replaced with another name which appropriately represents the function of the interface.

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UNIP-1 denotes an interface for managing a user service profile. That is, the UNIP-1 is an interface defining control and access between the client 110 and the IPTV service profile entity 114.

UNIP-7 denotes an interface allowing metadata of a service or a program guide to be used in a predetermined metadata format during searching for the service. Data for guiding at least one IPTV service is stored in a metadata storage unit. An IPTV service provider or a service platform provider can modify metadata stored in the metadata storage unit.

UNIP-8 denotes an interface for performing authentication when the client 110 tries to access an IPTV service.

UNIS-6 denotes an interface defined for the client 110 to request the IPTV applications entity 118 to provide a predetermined IPTV service. That is, the UNIS-6 is an interface allowing the client 110 to request the IPTV applications entity 118 (server that provides an IPTV service) to provide a predetermined IPTV service, and to receive the predetermined service in response to the request. The client 110 can access the IPTV applications entity 118 as guided by a GUI containing the URL or link information of the IPTV applications entity 118, which is received from the IPTV control entity 120. UNIS-6 may define an authentication process of checking an identifier or password of the client 110 if necessary.

UNIS-100 denotes an interface for the client 110 to receive information regarding IPTV services that can be received via the IPTV network, from the IPTV control entity 120. In this case, the client 110 may receive a GUI containing links to the IPTV services or create a page containing the links to the IPTV services by receiving only guide data regarding the IPTV services.

UNIS-101 denotes an interface defining control of content reproduction. UNIS-101 allows control of content reproduction, such as pausing, stopping, or fast-forwarding, during receiving and reproducing content, e.g., streaming data, from the content delivery entity 124.

UNIS-102 denotes an interface for managing and controlling a DRM key while the client 110 receives content.

UNIT-16 denotes an interface necessary for the client 110 to attach the IPTV network.

UNIT-17 denotes an interface defined in order to transmit content data to the client 110 through unicasting, multicasting or downloading. In this case, real-time transmission or non real-time transmission may be defined.

NPI-6 denotes an interface defined for the IPTV control entity 120 to access and manage the user profile information stored in the IPTV service profile entity 114. The IPTV control entity 120 accesses the user profile information in order to provide the client 110 with an individualized IPTV service.

NPI-2 denotes an interface defined for the IPTV applications entity 118 to register data regarding an IPTV service with the IPTV control entity 120 or cancel the data from the IPTV control entity 120. NPI-2 can also be used when the IPTV applications entity 118 registers information regarding an IPTV service provider with the IPTV control entity 120 or cancels it from the IPTV control entity 120.

NPI-9 denotes an interface defined for the IPTV control entity 120 to access and manage user information stored in the user database entity 130.

NPI-11 denotes an interface for retaining charging data generated when a user uses content.

NPI-4 denotes an interface for preventing information regarding IPTV services from being illegally used and checking whether the client 110 is an authenticated user, before the information is provided to the client 110.

NPI-20 denotes an interface for the IPTV metadata control entity 126 to control the metadata storage unit.

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NPI-100 denotes an interface for the IPTV control entity 120 to begin or manage content delivery.

NPI-101 denotes an interface for managing authentication information related to content delivery.

NPI-102 denotes an interface for the content delivery control entity 122 to control the content delivery entity 124 to control content delivery. NPI-102 may also define encryption of content.

FIG. 2 is a flowchart illustrating a method of providing/receiving a service according to an embodiment of the present invention. In detail, FIG. 2 illustrates a method of allowing a client 210 to receive a predetermined service from a server 240 of a service provider. It is assumed that the client 210 is an IPTV service client, such as an IPTV set top box, and the server 240 is an IPTV service server that provides an IPTV service. However, it would be obvious to those of ordinary skill in the art that the present invention can be applied to not only a method and apparatus for providing/receiving an IPTV service but also a method and apparatus for providing/receiving services of a plurality of service providers.

Hereinafter, it is understood that a method and apparatus for providing/receiving a service according to the present invention can be used to provide or receive at least one of an IPTV service received via a managed network and an IPTV service received via an open Internet network.

Referring to FIG. 2, in operation 250, the client 210 accesses a network attachment entity 220 in order to attach an IPTV network according to the present invention. The network attachment entity 220 provides an IP address to the client 210 so that the client 210 can access the IPTV network, and performs network-level authentication and network construction. In the open Internet network, an Internet service provider (ISP) that provides an Internet service provides the network attachment entity 220.

Information regarding a search server 230 may be provided to the client 210 while network attachment is made in operation 250. In operations 254 and 256, in order to access the search server 230 and the server 240, the client 210 must know the address of the search server 230 that is to be first accessed. When network attachment is made in operation 250, the URL of the search server 230 may be provided to the client 210. If the client 210 has already known the URL of the search server 230, the URL of the search server 230 does not need to be additionally provided to the client 210.

In operation 252, the server 240 registers information regarding at least one of services that the server 240 can provide, with the search server 230. The server 240 is a server of a service provider from among a plurality of service providers, and provides at least one IPTV service of the service provider. Here, the IPTV service includes a TV service, such as linear TV, and an IPTV application, such as CoD (content on demand), Push CoD, content downloading, network PVR, and messaging.

The search server 230 is an entity that provides the client 210 with information regarding IPTV services that can be provided via the IPTV network. The search server 230 stores not only information regarding IPTV services that the service provider can provide but also information regarding IPTV services that a plurality of service providers can provide in the IPTV network attached by the client 210. Thus, the client 210 can obtain information regarding all IPTV services that can be provided to the client 210 by accessing the search server 230.

In operation 254, the client 210 receives information regarding at least one of services of a plurality of service providers from the search server 230. The client 210 may receive information regarding at least one of IPTV services

that the client **210** can receive from a service provider selected from among a plurality of service providers, from the search server **230**. As described above, an IPTV service may include linear TV, CoD, push CoD, content downloading, network PVR, and messaging. The client **210** receives information regarding at least one IPTV service of a service provider selected from among a plurality of service providers by the client **210**.

The client **210** can perform authentication by accessing a predetermined entity (authentic management entity) that performs authentication management using an interface for authentication, and receive information regarding an IPTV service from the search server **230** after the authentication is completed. When the client **210** tries to access the search server **230** for the first time, the search server **230** first requests the client **210** to receive authentication from the authentication management entity. The client **210** receiving the request, requests the authentication management entity to authenticate the client **210**. The authentication management entity may perform authentication by transmitting the result of the authentication to the client **210** and the search server **230**. Alternatively, authentication may be performed by transmitting an encryption key for accessing the search server **230** to the client **210**.

The information regarding the IPTV service may include information regarding an entry point for requesting and receiving the IPTV service. The information regarding the entry point means information regarding a first page for receiving IPTV services of the server **240**. The first page may include a GUI containing links to the IP services. If the client **210** is compatible with web-based technology, the search server **230** may provide the client **210** with a web page containing the links to the IPTV services. Also, the search server **230** may create an eXtensible Markup Language (XML) document including information regarding an IPTV service and provide it to the client **210** so that the client **210** can individually create an entry point.

The information regarding the IPTV service may include metadata about the IPTV service and not the address of the server **240**. Information regarding all IPTV services including the URLs of the IPTV services, which is stored in the first server **240**, may be provided to the client **210** in the form of metadata. In this case, the search server **230** functions as an entity controlling IPTV metadata. The search server **230** provides the metadata to the client **210** by periodically multicasting or unicasting the metadata, in response to a request from the client **210**. Operation **254** is performed using a predetermined interface defined between the search server **230** and the client **210** in order to exchange information regarding an IPTV service.

In operation **256**, the client **210** requests to provide a predetermined service based on the information regarding the IPTV service received in operation **254**. The client **210** selects the predetermined service based on the information regarding the IPTV service, which was received in operation **254**, and requests the server **240** to provide the selected service.

In operation **258**, the client **210** receives the predetermined service from the server **240**. That is, the client **210** receives the IPTV service requested in operation **256**.

FIG. **3** illustrates a method and apparatus for providing/receiving a service according to another embodiment of the present invention. That is, FIG. **3** illustrates operations **252** and **254** illustrated in FIG. **2** in greater detail.

Referring to FIG. **3**, in operation **360**, a client **310** accesses a network attachment entity **320** in order to access an IPTV network according to the present invention. Information regarding the addresses of a first search server **330** and a

second search server **340** may be provided to the client **310** while performing network attachment, as described above with respect to operation **250** illustrated in FIG. **2**.

In the method of FIG. **3**, the two separate search servers **330** and **340** are present. Thus, either only the address of the first search server **330** that is to be first accessed or both the addresses of the first and second search servers **330** and **340** may be provided to the client **310**. If the client **310** already knows the addresses of the first and second search servers **330** and **340**, their addresses do not need to be additionally provided.

In operation **362**, a server **350** registers information regarding a service provider with the first search server **330**. Here, the server **350** belongs to the service provider. The first search server **330** is an entity providing information regarding a plurality of IPTV service providers that provide an IPTV service in an IPTV network according to the present invention. The information regarding the IPTV services is provided to the client **310**. To this end, in operation **362**, the information regarding the service provider from among the service providers is registered with the first search server **330**.

In operation **364**, the server **350** registers information regarding at least one of IPTV services that the server **350** of the service provider can provide to the client **310**, with the second search server **340**. The second search server **340** is an entity providing information regarding at least one of IPTV services of a plurality of IPTV service providers.

As described above, an IPTV service may include at least one of linear TV, CoD, push CoD, content downloading, network PVR, and messaging.

In operation **366**, the first search server **330** provides the client **310** with the information regarding the IPTV service providers. The information regarding the IPTV service providers who provide an IPTV service via the IPTV network according to the present invention is registered with the first search server **330**, and the first search server **330** provides the information to the client **310**. A predetermined interface defined in order to transmit information regarding a service provider is used in order to deliver the information regarding the IPTV service providers to the client **310**. The information regarding the IPTV service providers, which is provided to the client **310**, is necessary for the client **310** to select a desired service provider from among the IPTV service providers. Information, such as names or logos of the IPTV service providers, may be provided to the client **310**.

The information regarding the IPTV service providers is provided to the client **310** only when the client **310** receives authentication from an authentication management entity by using a predetermined interface defined for authentication.

In operation **368**, the client **310** selects a predetermined service provider based on the information regarding the IPTV service providers received in operation **366**. That is, an IPTV service provider is selected from among the IPTV service providers based on the information regarding the IPTV service providers received in operation **366**.

In operation **370**, the client **310** receives information regarding at least one IPTV service that can be received from the server **350** of the IPTV service provider selected in operation **368**, from the second search server **340**. The client **310** requests the second search server **340** to provide information regarding at least one service of the selected service provider via a predetermined interface defined to request information regarding a service, and receives the information regarding the at least one service provided in response to the request.

The information regarding the IPTV service may be information regarding an entry point for requesting and receiving

the IPTV service, that is, it may be a first page allowing the IPTV services of the server **350** to be used.

In the method illustrated in FIG. **3**, information regarding IPTV service provider and an IPTV service is provided to the client **310** via the two separate search servers **330** and **340**. The client **310** first accesses the first search server **330** in order to select a desired IPTV service provider, and receives information regarding at least one service of the selected IPTV service provider from the second search server **340**.

In operation **372**, the client **310** selects a predetermined IPTV service based on the information regarding the services of the selected service provider.

In operation **374**, the client **310** requests the server **350** to provide the service selected in operation **372**. In operation **376**, the client **310** receives the selected service. Operations **374** and **376** are performed using a predetermined interface defined in order to request and receive a service.

FIG. **4** illustrates a method and apparatus for providing/receiving a service according to another embodiment of the present invention. In detail, FIG. **4** illustrates a case where information regarding an IPTV service as described above with reference to FIGS. **2** and **3** is metadata.

Referring to FIG. **4**, a metadata control entity **420** collects metadata regarding an IPTV service/content guide received via an IPTV network from a content provider or a content information provider, and provides the collected metadata to clients. The service guide is an electronic guide including additional information regarding IPTV functions, information regarding service providers, and information regarding appropriate service access, which are necessary for a user to select a desired IPTV function. The content guide is an electronic guide that a user uses to select, discover, or navigate content according to time, title, channel, genre, etc. . . . In operation **450**, a client **410** requests the metadata control entity **420** to provide metadata regarding at least one service of a plurality of service providers in an IPTV network or metadata regarding the content guide.

In operation **452**, the metadata control entity **420** distributes the metadata regarding the at least one service of the content guide to the client **410**, in response to the request made in operation **450**. The metadata may be distributed to the client **410** through unicasting or multicasting only when the client **410** clearly requests it as in operation **450**, but the metadata may be periodically distributed to the client **410** through multicasting regardless of a request from the client **410**. Operations **450** and **452** are performed using an interface defined between the client **410** and the metadata control entity **420** in order to request and distribute metadata.

In operation **454**, the client **410** requests a server **430** to provide a service and receives the service from the server **430** in operation **456**.

FIG. **5** illustrates a method and apparatus for providing/receiving a service according to another embodiment of the present invention. FIG. **5** illustrates DRM of content provided from a server **550**. That is, FIG. **5** illustrates a DRM method used when the client **510** requests and receives content stored in a server **550** through CoD, Push CoD, content downloading, and network PVR.

In operation **560**, the client **510** establishes a service session and channel with the server **550** of an IPTV service provider. The client **510** accesses a search server according to the present invention by receiving authentication from an authentication management entity **540**, and receives information regarding at least one IPTV service that can be received from the server **550**, from the search server. Then, the client **510** selects an IPTV service from among the at least one IPTV service based on the received information, and establishes a

service session and channel with a server **550**. Then, the service session and channel are formed, and delivery of content related to a predetermined service is performed in operations **562** through **576**.

In operation **562**, the client **510** requests the server **550** to provide predetermined content. That is, the client **510** requests the server **550** to deliver the predetermined content from among content of the server **560**, based on the information regarding the IPTV service received in operation **560**.

In operation **564**, the server **550** requests a content delivery control entity **530** to deliver the requested content to the client **510**. Information regarding the requested content and information regarding the client **510** are transmitted to the content delivery control entity **530**.

The content delivery control entity **530** determines whether the request for delivery of the predetermined content from the client **510** is available. Also, the content delivery control entity **530** determines whether a DRM key received from the client **510** is valid, prior to starting a content delivery session. The content delivery control entity **530** manages the DRM key and content encryption, and can update the DRM key by receiving related information from the authentication management entity **540**. Also, as will later be described, the content delivery control entity **530** can control reproduction of reproduction during streaming of the content.

The content delivery control entity **530** provide the server **550** with information regarding whether the content can be delivered and information regarding DRM applied to the content, in response to the request from the server **550**.

In operation **566**, the server **550** provides the client **510** with the information regarding the DRM applied to the content and information regarding the content delivery control entity **530**, in response to the request for delivery of the content in operation **562**. The information regarding the DRM may include information regarding the DRM key, and the information regarding the content delivery control entity **530** may include information regarding the address of the content delivery control entity **530**.

In operation **568**, the client **510** requests the content delivery control entity **530** to start the content delivery session based on the information regarding the address of the content delivery control entity **530** that is received in operation **566**. In this case, the DRM key, information about which is received in operation **570**, is also transmitted to the content delivery control entity **530**.

In operation **570**, the content delivery control entity **530** requests the authentication management entity **540** to deliver at least one of DRM policies and a DRM key seed, and receives at least one of the DRM policies and the DRM key seed provided in response to the request. Operation **570** is performed using an interface for DRM, defined between the content delivery control entity **530** and the authentication management entity **540**. The authentication management entity **540** authenticates the client **510** and a user of the client **510**, and manages the DRM policies and DRM key of content provided as an IPTV service.

The content delivery control entity **530** determines whether the request for starting the content delivery session from the client **510** is available, based on the DRM policies and the DRM key seed received from the authentication management entity **540** and the DRM key that was received from the client **510** in operation **568**.

In operation **572**, the content delivery control entity **530** controls the content delivery entity **520** to begin the content delivery session. If it is determined that the request to start the content delivery session from the client **510** is available, the information regarding the requested content and the address

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of the client **510** is transmitted to the content delivery entity **520** so that the content delivery session can begin. The content delivery entity **520** is charged with content processing, e.g., content encryption, and content delivery and distribution. Operation **572** is performed using an interface defined between the content delivery control entity **530** and the content delivery entity **520** in order to control delivery of content of the content delivery entity **520**. Also, the interface defined between the content delivery control entity **530** and the content delivery entity **520** may define control of content encryption performed by the content delivery entity **520**.

In operation **574**, the content delivery control entity **530** transmits information regarding the content delivery entity **520** to the client **510**, in response to the request to start the content delivery session in operation **568**. In operation **576**, the content delivery entity **520** delivers the content to the client **510**. Operations **568** and **574** are performed using an interface defined between the client **510** and the content delivery control entity **530** in order to request starting of the content delivery session and to respond to the request.

There is a case where the client **510** requests control of reproduction of content during the reproduction of the content. For example, the client **510** may request pausing, or jumping forward or backward during reproduction of network PVR content. In this case, the client **510** may transmit a request for the content delivery control entity **530** to control the reproduction of the content, and the content delivery control entity **530** transmit the request to the content delivery entity **520**, thereby performing control of the content reproduction.

Such control of content reproduction is referred to as a 'trick mode'. The trick mode is performed using an interface between the client **510** and the content delivery control entity **530** and an interface between the content delivery entity **520** and the content delivery control entity **530**, which are defined in order to control content reproduction.

FIG. 6 illustrates a method and apparatus for providing/receiving a service according to another embodiment of the present invention. In detail, FIG. 6 illustrates a method of allowing the client **610** to receive a second service by switching from a first service to the second service during receiving of the first service. In other words, FIG. 6 illustrates a method of allowing the client **610** to insert an advertisement since the client **610** must receive and reproduce the advertisement in order to switch from the first service to the second service while receiving the first service.

In operation **660**, the client **610** receives the first service from a server **640** of an IPTV service provider by establishing a session and channel of the first service. To this end, the client **610** accesses a search server according to the present invention by receiving authentication from an authentication management entity, and receives information regarding at least one IPTV service, which can be received from the server **640**, from the search server. Then, the client **610** establishes with the session and channel of the first service with the server **640** by selecting an IPTV service from among the at least one IPTV service based on the information regarding the IPTV service.

In operation **662**, the client **610** requests the server **640** to provide the second service. Since the client **610** has already retained the information regarding the at least one IPTV service, the client **610** selects the second service from among the at least one IPTV service.

In operation **664**, the server **640** requests an IPTV control entity **630** to provide an advertisement service. When an advertisement needs to be provided between the first and

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second services in order to provide the second service, the server **640** requests the IPTV control entity **630** to provide the advertisement.

In operation **666**, the IPTV control entity **630** requests an advertisement server **650** to provide a predetermined advertisement. In this case, an individualized advertisement may be required using user profile information of the client **610**. An advertisement that the client **610** desires to receive may be requested by analyzing the propensity of the client **610**.

In operation **668**, the advertisement server **650** transmits information regarding the predetermined advertisement to the IPTV control entity **630** in response to the request received in operation **666**. For example, the advertisement that is to be delivered to the client **610**, and the address of a content delivery control entity **620** that is to transmit the advertisement are delivered to the IPTV control entity **630**.

In operation **670**, the IPTV control entity **630** requests the content delivery control entity **620** to start an advertisement delivery session.

In operation **672**, the content delivery control entity **620** controls a content delivery entity to deliver the requested advertisement to the client **610**, in response to the request from the IPTV control entity **630**.

In operation **674**, the content delivery control entity **620** informs the IPTV control entity **630** of the end of the advertisement delivery session when the delivery of the advertisement is completed.

In operation **676**, the IPTV control entity **630** informs the server **640** of the end of the advertisement service, and thus, in operation **678**, the server **640** provides the second service to the client **610**.

FIG. 7 is a block diagram of a client **700** according to an embodiment of the present invention. Referring to FIG. 7, the client **700** includes a service search unit **710** and a service receiving unit **720**.

The service search unit **710** receives information regarding at least one of a plurality of service providers from a search server. The client **700** is an IPTV client, and receives information regarding at least one IPTV service of a plurality of service providers in an IPTV network from the search server. The client **700** may receive information regarding at least one service of a service provider selected from among a plurality of service providers by the client **700**.

There is a case where the search server includes separate entities: a first search server that provides information regarding a plurality of service providers and a second search server that provides information regarding services of each of the service providers. In this case, the information regarding the service providers is first received from the first search server, and a service provider is selected from among the service providers based on the received information. Then, information regarding at least one service that can be received from the server of the selected service provider is received from the second search server. The information regarding the at least one service provider may include at least one of a name and logo of each of the IPTV service providers. The information regarding the at least one service may include information regarding a service entry point, i.e., information regarding a first page allowing use of IPTV services that can be received from the server.

The service receiving unit **720** requests the server to provide a service selected from among at least one service that can be received from the server, and receives the selected service provided in response to the request.

FIG. 8 is a block diagram of a search server **800** according to an embodiment of the present invention. Referring to FIG.



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8, the search server **800** includes an information storage unit **810** and an information providing unit **820**.

The information storage unit **810** receives information regarding a service provider and/or information regarding a service from a plurality of service providers in an IPTV network.

The search server **800** may include separate entities: a first search server that registers information regarding a plurality of service providers and a second search server that receives information regarding at least one service of each of the service providers from a corresponding server from among a plurality of servers and then registers the received information.

Thus, if the search server **800** is one entity, it registers information regarding a plurality of service providers and information regarding services received from a plurality of servers of the service providers. However, if the search server **800** includes the first search server and the second search server, the information storage unit **810** registers information regarding a plurality of service providers and information regarding services.

When the search server **800** acts as the first search server, the information storage unit **810** registers only information regarding a plurality of service providers, but when the search server **800** acts as the second search server, the information storage unit **810** registers information regarding at least one service.

The information providing unit **820** provides a client with information regarding a plurality of service providers, and information regarding at least one service of a service provider selected from among the service providers by the client. If the search server **800** includes the first search server and the second search server as described above, information regarding a plurality of service providers or information regarding at least one service is provided to the client.

If the search server **800** acts as the first search server, the information providing unit **820** provides information regarding a plurality of service providers to the client. If the search server **800** acts as the second search server, the information providing unit **820** provides information regarding at least one service to the client.

FIG. 9 is a block diagram of a server **900** according to an embodiment of the present invention. Referring to FIG. 9, the server **800** provides an IPTV service in an IPTV network according to the present invention, and includes an information registration unit **910** and a service providing unit **920**. It is assumed that the server **900** is a server of a service provider from among a plurality of service providers in the IPTV network.

The information registration unit **910** registers information regarding at least one service that can be provided from the service provider, with a search server. As described above, the search server may include separate entities: a first search server that provides information regarding a plurality of service providers and a second server that provides information regarding services of each of the service providers.

In this case, the information registration unit **910** registers information regarding the service provider with the first search server, and information regarding at least one service of the service provider with the second search server.

The service providing unit **920** receives a request for a predetermined service from a client, and provides the client with the predetermined service in response to the request. For example, a service is provided to a client authenticated by a predetermined authentication management entity. The client requests the service providing unit **920** to provide a service, based on the information regarding the service provider and

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the information regarding the at least one service of the service provider, which is registered by the information registration unit **910**.

The system according to the present invention can be embodied as computer readable code in a computer readable medium. Here, the computer readable medium may be any recording apparatus capable of storing data that is read by a computer system, e.g., a read-only memory (ROM), a random access memory (RAM), a compact disc (CD)-ROM, a magnetic tape, a floppy disk, an optical data storage device, and so on. Also, the computer readable medium may be a carrier wave that transmits data via the Internet, for example. The computer readable medium can be distributed among computer systems that are interconnected through a network, and the present invention may be stored and implemented as computer readable code in the distributed system.

According to the above embodiments of the present invention, a client can precisely search for and receive a desired service in a predetermined network via which a plurality of service providers provide services. In particular, the client can search for and receive not only an IPTV service of a service provider in a managed network but also an IPTV service of a service provider in an open Internet network, thereby improving the quality of IPTV service and increasing the fundamentals of IPTV service.

While this invention has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A method providing information regarding a service to a client, the method comprising:

receiving, at a first search server, first information regarding a plurality of service providers including a first service provider, at least part of the first information being registered in the first search server by a first server of the first service provider;

receiving, at a second search server, second information regarding at least one service which is to be received from the first server of the first service provider; at least part of the second information being registered in the second search server by the first server of the first service provider; and

providing the first information and the second information to a client, wherein the first search server and second search server are separate physical devices; and wherein the first search server and the second search server are separate from at least one server belonging to the plurality of service providers including the first server of the first service provider,

wherein at least one service is transmitted from the first server to the client based on the provided first and second information,

wherein the at least one service is an Internet protocol television (IPTV) service, and the plurality of service providers include a plurality of IPTV service providers.

2. The method of claim 1, wherein the second information regarding the at least one service includes an entry point of at least one IPTV service.

3. The method of claim 1, wherein the second information regarding the at least one service includes metadata about at least one IPTV service.

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4. The method of claim 1, wherein the first information regarding the plurality of IPTV service providers comprises at least one of the name and logo of each of the IPTV service providers.

5. The method of claim 1, wherein the IPTV service comprises at least one of a linear TV service, a personal video recording (PVR) service, and a content on demand (CoD) service.

6. A method of providing a service to a client, the method comprising:

registering, with a first search server, first information regarding a service provider, at least part of the first information being registered in the first search server by a first server of the service provider;

registering, with a second search server, second information regarding at least one service that is to be provided from the service provider, at least part of the second information being registered in the second search server by the first server of the service provider;

receiving a request for the at least one service from a client, the request being made by the client based on the first information and the second information; and providing the at least one service to the client in response to the request, wherein the first search server and second search server are separate physical devices, and

wherein the first search server and the second search server are separate from at least one server belonging to the service provider including the first server of the service provider, and

wherein the at least one service is an Internet Protocol Television (IPTV) service, and the service provider is an IPTV service provider.

7. The method of claim 6, wherein the second information regarding the at least one service includes information regarding an entry point of at least one IPTV service.

8. The method of claim 6, wherein the second information regarding the at least one service includes metadata about at least one IPTV service.

9. The method of claim 6, wherein the first information regarding the service provider comprises at least one of a name and logo of the service provider.

10. The method of claim 6, wherein the at least one service comprises at least one of a linear TV service, a personal video recording (PVR) service, and a content on demand (CoD) service.

11. A search server system for providing information regarding a service, the search server system comprising:

a first search server which receives first information regarding a plurality of service providers including a first service provider, and provides the first information to a

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client, at least part of the first information being registered in the first search server by a first server of the first service provider; and

a second search server which receives second information regarding at least one service which is to be received from the first server of the first service provider, and provides the second information to the client, at least part of the second information being registered in the second search server by the first server of the first service provider,

wherein the first search server and second search server are separate physical devices, and wherein the first search server and the second search server are separate from at least one server belonging to the plurality of service providers including the first server of the first service provider,

wherein the at least one service is transmitted from the first server to the client based on the provided first and second information, and

wherein the service includes an IPTV (Internet protocol television) service, and the service providers are a plurality of IPTV service providers.

12. A server of a service provider providing a service to a client, the server comprising:

an information registration unit which:

registers, with a first search server, first information regarding a service provider;

registers, with a second search server, second information regarding at least one service that is to be provided from the service provider; and

a service providing unit which receives a request for a service from the client and provides the service to the client in response to the request,

wherein the request is made based on the first information and the second information,

wherein the first search server and second search server are separate physical devices, and wherein the first search server and the second search server are separate from at least one server belonging to the service provider including the server, and

wherein the service is an IPTV (Internet protocol television) service and the service provider is an IPTV service provider.

13. A non-transitory computer readable medium having recorded thereon a computer program for executing the method of claim 1.

14. A non-transitory computer readable medium having recorded thereon a computer program for executing the method of claim 6.

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